

(Part-I)

Q.2. Write short answers to any FIVE (5) questions: (10)

(i) What is meant by biosphere and zone of life?

Ans The part of the Earth inhabited by organisms' communities is known as biosphere. It constitutes all ecosystems (area where living organisms interact with the non-living component of environment) and is also called the zone of life on Earth.

(ii) Compare cell level and tissue level.

Ans Tissue level:

In multicellular organisms, similar cells are organized into groups, called tissues. We can define a tissue as a group of similar cells specialized for the performance of a common function.

Cell level:

Biomolecules assemble in a particular way and form organelles. The organelles are actually sub-cellular structures and when they assemble together, units of life i.e., cells are formed.

(iii) What are quantitative observations? Give example.

Ans Quantitative observations are considered more accurate than qualitative ones because the former are invariable and measurable and can be recorded in terms of numbers.

Example:

(iv) The freezing point of water is 0°C and boiling point is 100°C .

What is meant by deductions?

Ans The logical consequences of hypotheses is called deduction. For this purpose, a hypothesis is taken as true and expected results (deductions) are drawn from it.

(v) What is difference between extinct and endangered species?

Ans **Extinct Species:**

In an ecosystem, a species is called extinct when there is no doubt that the last individual of that species has died in that ecosystem.

Endangered Species:

A species is called endangered when it is at risk of extinction in near future.

(vi) Differentiate between flora and fauna.

Ans The main difference between flora and fauna is that flora refers to plant life whereas fauna refers to animal life. Flora make food with the help of solar. Fauna cannot make their own food.

(vii) Give two principles of cell theory.

Ans The important principles of cell theory are as follows:

1. Every organism is composed of cells.
2. Cell is the basic structural and functional unit of all the organisms.

(viii) What is discovered by Schleiden and Schwann?

Ans In 1838, a German botanist Matthias Schleiden studied plant tissues and made the first statement of cell theory.

In 1839, a German zoologist Theodor Schwann reported that all animal tissues are also composed of individual cells.

The Schwann and Schleiden proposed cell theory in its initial form.

Q.3. Write short answers to any FIVE (5) questions: (10)

(i) Describe non-disjunction.

Ans During anaphase-I, chromosomes separate and go to opposite poles while during anaphase-II, sister chromosomes separate. It is called disjunction. Sometimes, the separation is not normal and it is called non-disjunction.

How cytokinesis takes place in plant cell?

(iii) **Ans** Cytokinesis in plant cells occurs differently. Vesicles derived from the Golgi apparatus move to the middle of cell and fuse to form a membrane-bounded disc called cell plate or phragmoplast. The plate grows outward and more vesicles fuse with it. Finally, membranes of cell plate fuse with plasma membrane and its contents join the parental cell wall.

(iv) What is metastasis?

Ans The tumor can send cancer cells to other parts in body where new tumors may form. This phenomenon is called metastasis (spreading of disease).

(v) What is effect of pH on rate of enzyme action?

Ans All enzymes work at their maximum rate at a narrow range of pH. A slight change in this pH cause retardation in enzyme activity or block it completely.

(vi) Describe induced fit model.

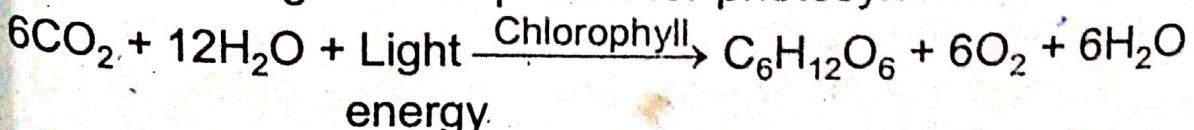
Ans In 1958, an American biologist Daniel Koshland suggested a modification to "Lock and key" model and proposed induced-fit model. According to this model, active site is not a rigid structure rather it is molded into the required shape to perform its function. Induced-fit model is more acceptable than lock and key model.

(vii) What is cellular respiration?

Ans The cellular energy-yielding process is called cellular respiration. In cellular respiration, food is oxidized to CO_2 while O_2 is reduced into H_2O .

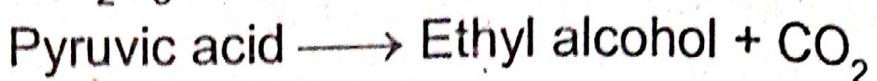
(viii) What is photosynthesis? Write its chemical equation.

Ans Photosynthesis is the synthesis of glucose from carbon dioxide and water in the presence of sunlight and chlorophyll. The oxygen is released as a by-product in this process. The general equation for photosynthesis is:



(viii) Describe alcoholic fermentation.

Ans It occurs in bacteria, yeast, etc. In this type of anaerobic respiration, pyruvic acid is further broken down into alcohol (C_2H_5OH) and CO_2 .



Q.4. Write short answers to any FIVE (5) questions: (10)

(i) Define nutrition.

Ans The process in which food is obtained or prepared, absorbed and converted into body substances for growth and energy, is called nutrition.

(ii) Write benefit of mastication.

Ans Mastication is useful because oesophagus can pass only small pieces. Enzymes also cannot act on large pieces of food. They require small pieces with large surface area to attack.

(iii) Differentiate between ingestion and digestion.

Ans The process of taking in food is called ingestion. The process of breaking up complex substances into simpler substances is called digestion.

(iv) What is WFP?

Ans The World Food Program (WFP) is the food aid branch of the United Nations. It is the world's largest agency providing food to more than 90 million people in 80 countries.

(v) Write down two functions of root in plants.

Ans Two functions of root in plants are given below:

1. Root in plants absorb water and inorganic nutrients.
2. They stores food and nutrients.

(vi) Write difference between source and sink.

Ans **Source:**

The areas of sources include an exporting organ typically a mature leaf that is capable of:

1. Storing photosynthate in excess of its own needs.
2. Storage organ during the exporting phase of its development.

Sink:

Sinks are the areas of active metabolism or storage roots, tubers developing fruits and immature leaves and even the growing tips of stem and root.

(vii) Why is dengue fever dangerous for human?

Ans Dengue fever is a viral infection transmitted through a mosquito. The female Aedes mosquito bites an infected person. Viruses enter his/her blood and attack white blood cells. Viruses reproduce and destroy them. In severe cases, the viruses affect liver and bone marrow. As a result, there is a decrease in the production of blood platelets and patient suffers from bleeding.

(viii) How many types of cells are found in blood? Write two name of these.

Ans There are three types of cells found in blood and their names are:

1. Red blood cells (erythrocytes)
2. White blood cells (leukocytes)
3. Platelets (thrombocytes)

(Part-II)

Note: Attempt any TWO (2) questions.

Q.5.(a) Describe unicellular organization, multi-cellular organization and colonial organization. (5)

Ans Cells organize in three ways to make the bodies of organisms. Cells make unicellular, colonials and multicellular organizations and the organisms formed through these organizations are unicellular organisms, colonial organisms and multicellular organisms.

Unicellular organization:

In unicellular organisms, only one cell makes the life of an organism. All the life activities are carried out by the only cell. Amoeba, Paramecium and Euglena are common examples.

Colonial organization:

In colonial type of cellular organization, many unicellular organisms live together but do not have any division of labour among them. Each unicellular organism in a colony lives its own life and does not depend on other cells for its vital requirements. *Volvox* is a green alga found in water that shows colonial organization. Hundreds of *Volvox* cells make a colony.

Multicellular organization:

In multicellular organization, cells are organized in the form of tissues, organs and organ systems. Frog and mustard are the familiar examples of multicellular organization.

- (b) Write structure and functions of xylem and phloem tissues. (4)

Ans → Xylem Tissues:

Xylem tissue is responsible for the transport of water and dissolved substances from roots to the aerial parts. Due to the presence of lignin, the secondary walls of its cells are thick and rigid. That is why, xylem tissue also provides support to plant body. Two types of cell are found in xylem tissue i.e., vessel elements and tracheids. Vessel elements or cells have thick secondary cell walls. They lack end walls and join together to form long tubes. Tracheids are slender cells with overlapping ends.

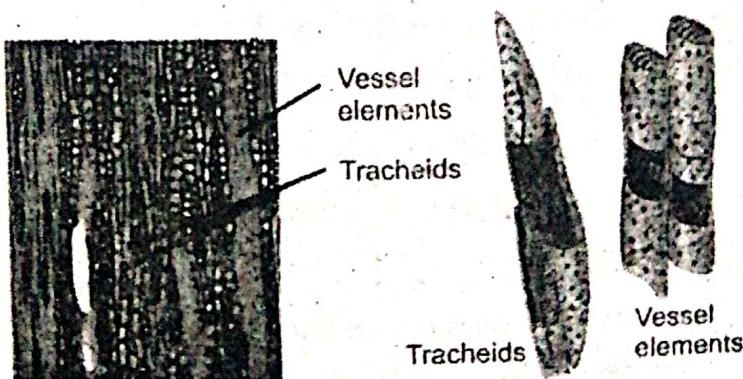


Fig. Xylem tissue.

Phloem Tissue:

Phloem tissue is responsible for the conduction of dissolved organic matter (food) between different parts of

plant body. Phloem tissue contains sieve tube cells and companion cells. Sieve tube cells are long and their end walls have small pores. Many sieve tube cells join to form long sieve tubes. Companion cells make proteins for sieve tube cells.

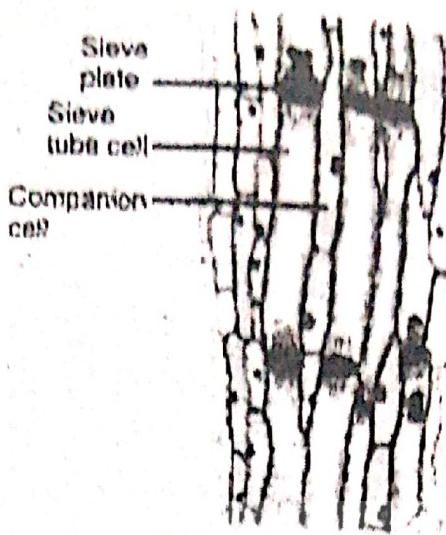


Fig. Phloem tissue.

Q.6.(a) Explain affects of temperature and substrate concentration on rate of enzyme action. (5)

Ans **Temperature:**

Increase in temperature speeds up the rate of enzyme catalyzed reactions, but only to a point (see figure below). Every enzyme works at its maximum rate at a specific temperature called as the optimum temperature for that enzyme.

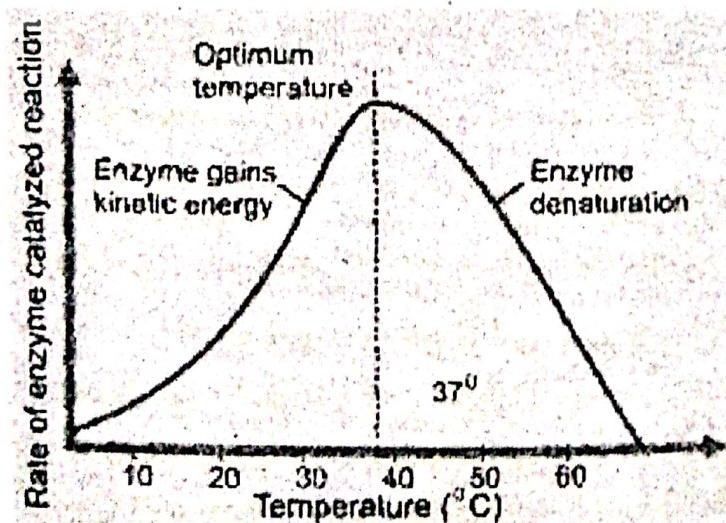


Fig. Effect of temperature on enzyme activity.

When temperature rises to a certain limit, heat adds in the activation energy and also provides kinetic energy

for the reaction. So reactions are accelerated. But when temperature is raised well above the optimum temperature, heat energy increases the vibrations of atoms of enzyme and the globular structure of enzyme is lost. This is known as the denaturation of enzyme. It results in a rapid decrease in rate of enzyme action and it may be blocked completely.

Substrate concentration:

If enzyme molecules are available in a reaction, increase in substrate concentration increases the rate of reaction. If enzyme concentration is kept constant and amount of substrate is increased, a point is reached where any further increase in substrate does not increase the rate of reaction anymore. When the active sites of all enzymes are occupied (at high substrate concentration), any more substrate molecules do not find free active sites. This state is called saturation of active sites and reaction rate does not increase.

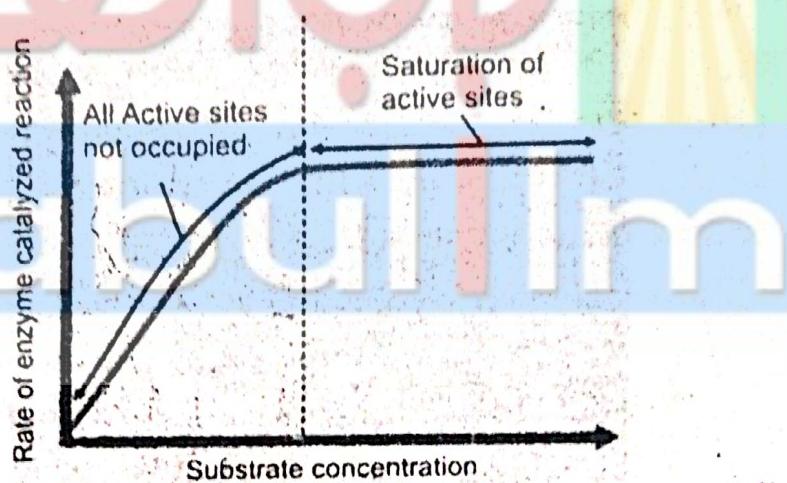


Fig. Effect of substrate concentration on enzyme activity.

- (b) Write a note on energy budget of respiration. (4)

Ans Energy Budget of Respiration:

Each NADH produces 3 ATP in electron transport chain. The NADH generated in glycolysis gives 2 ATP because 1 ATP is spent to transport it across the mitochondrial membrane. Each FADH_2 produces 2 ATP. The total output of ATPs can be calculated from the data in figure below. Note that during anaerobic oxidation of a

glucose molecule only 2 ATP molecules are gained as the net profit. It is because there is no Krebs cycle and electron transport chain in anaerobic respiration.

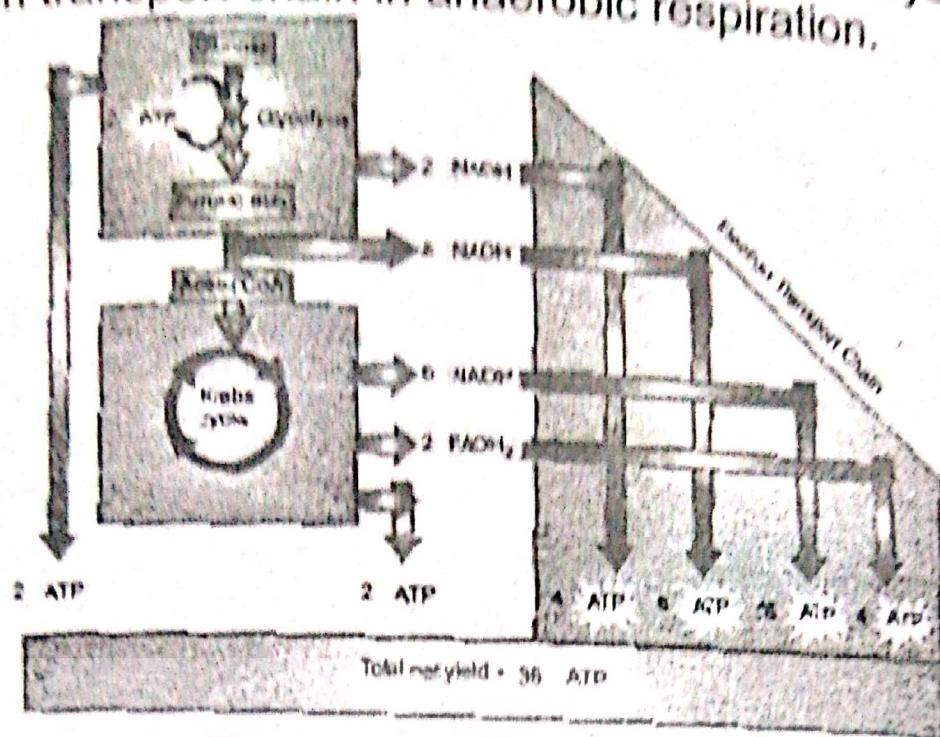


Fig. Energy chart of respiration.

Q.7.(a) Describe importance of fertilizers.

(5)

Ans For Answer see Paper 2016 (Group-II), Q.7.(a).

(b) Write a note on ABO blood group system.

(5)

Ans ABO Blood Group System:

It is the most important blood group system in humans. It was discovered by the Austrian scientist Karl Landsteiner, who found four different blood groups (blood types) in 1900. He was awarded the Nobel Prize in Medicine for his work.

In this system, there are four different blood groups which are distinct from each other on the basis of specific antigens (antigen A and B) present on the surface of RBCs. A person having antigen A has blood group A, a person having antigen B has blood group B, a person having both antigens has blood group AB, and a person having none of the A and B antigens has blood group O.

After birth, two types of antibodies i.e., anti-A & anti-B antibodies appear in the blood serum of individuals. These antibodies are present according to the absence of corresponding antigen. In persons with blood group A, antigen A is present and antigen B is absent. So their blood will contain anti-B antibodies. In persons with blood group B, antigen B is present and antigen A is absent. So their blood will contain anti-A antibody. In persons with blood group AB, antigens A & B are present i.e., neither is absent. So their blood serum will contain no antibody. In persons with blood group O, neither antigen A nor antigen B is present i.e., both are absent. So their blood serum will contain both antibodies i.e., anti-A & anti-B.